

SUPPORT FOR THE AMENDMENTS

This Amendment cancels withdrawn Claims 23-25; and amends Claims 1-2, 13 and 15. Support for the amendments is found in the specification and claims as originally filed. In particular, support for Claim 1 is found in the specification at page 4, line 11 ("continuous stirred tank reactor"). Support for Claim 13 is found in the specification at least at page 6, line 26. No new matter would be introduced by entry of these amendments.

Upon entry of these amendments, Claims 1-22 will be pending in this application. Claim 1 is independent. Claim 18 is withdrawn from consideration.

REQUEST FOR RECONSIDERATION

Applicants respectfully request entry of the foregoing and reexamination and reconsideration of the application, as amended, in light of the remarks that follow.

Applicants thank the Examiner for the courtesies extended to their representative during the personal interview on July 13, 2007.

As discussed at the personal interview, the present invention provides a continuous process for the preparation of filled rubber granules from rubber latex emulsions by precipitation from aqueous mixtures. Specification at page 1, lines 9-10. Conventional problems associated with the use of continuous tubular reactors to prepare filled rubber granules are surprisingly solved by the present invention using continuous stirred tank reactors. Specification at page 4, lines 10-11.

Claims 1-17 and 19-22 are rejected under 35 U.S.C. §103(a) over U.S. Patent No. 6,348,522 ("Smigerski-522"). In addition, Claims 1-17 and 19-22 are rejected under 35 U.S.C. §103(a) over U.S. Patent No. 4,788,231 ("Smigerski-231"). Furthermore, Claims 1-17 and 19-22 are rejected under 35 U.S.C. §103(a) over U.S. Patent Application Publication No. US 2002/0091190 A1 ("Goerl"). Moreover, Claims 1-17 and 19-22 are rejected on the

ground of nonstatutory obviousness-type double patenting over Claims 1, 5, 7, 10-11, 13 and 17 of U.S. Patent No. 6,878,759.

Smigerski-522 discloses a process for continuous preparation of filler-containing rubber powders in which a liquid mixture is passed through a tube. Smigerski-522 at Abstract.

Smigerski-231 discloses a process, which can be carried out either continuously or discontinuously, for preparing a pourable powder rubber containing filler. Smigerski-231 at Abstract; column 4, lines 50-51. Smigerski-231 discloses that the continuous mode of operation can be in a tube. Smigerski-231 at column 4, lines 60-64.

Goerl discloses a process for preparing silica-filled rubber powder that can be carried out either batchwise or continuously. Goerl at Abstract; [0047].

The claims of the '759 patent disclose a process in which a step b) of contacting a rubber latex emulsion and a suspension containing a filler is carried out with stirring. See Claim 16 of '759.

However, Smigerski-522, Smigerski-231, Goerl and the claims of the '759 patent fail to suggest the independent Claim 1 limitation of "continuously and simultaneously feeding an aqueous filler mixture comprising at least one filler, and an aqueous rubber emulsion or latex into a reactor system ..., wherein the reactor system comprises two or more *continuous stirred tank reactors* in series".

As discussed above, the process of the present invention using continuous stirred tank reactors solves in a surprisingly simple manner a variety of problems associated with the tubular reactors of the cited prior art. Specification at page 4, lines 10-11. Regarding tubular reactors, the specification discloses:

The **tubular reactors** described by way of example have very low flow rates and give inadequate mixing of filler and rubber emulsion and therefore very inhomogeneous products. In addition, the **very short residence times (about 5 s)** appear to be **insufficient to complete the coagulation of**

the rubber (in particular of natural latex). ... [T]his would lead to a requirement for a downstream mixer.

Another expected limitation of this process is a *fixed* residence time in the apparatus due to the fixed tube length. This may **restrict uses of the apparatuses to only one particular mixing specification** and, furthermore, **may make the apparatus very susceptible to variations in the properties of the starting materials**, e.g., the coagulation behavior thereof or emulsion.

In addition, considerable **blockage problems** may be expected due to the properties of the latex and due to the fact that a tube is a vessel with **very high specific surface area (ratio of wall area to reactor volume)**. A result of very low flow rates and the incorporation of additional constrictions (flow restrictor sections and static mixtures), is an increased risk of blockage and inability to prepare the products reproducibly. Specification at page 3, lines 4-18 (emphasis added).

In contrast to continuous tubular reactors, the **continuous stirred tank reactors** of the present invention have a relatively **low specific surface area** (ratio of wall area to reactor volume) which greatly decreases the risk of blockage. In addition, the continuous stirred tank reactor has a relatively **long average residence time** (see, e.g., specification at page 10, lines 24-25 (**0.8 min**); page 11, line 12 (**11 min**); page 12, line 2 (**11 min**); page 12, lines 24-25 (**23 min**)) which ensures complete coagulation of the rubber and tolerates variations in process parameters.

Compared to the continuous tubular reactors of the cited prior art, the continuous stirred tank reactors of the present invention provide significant improvements in avoidance of apparatus blockage, tolerance in relation to variations in properties of starting materials, and limitations on variations in formulations. Specification at page 3, lines 28-31.

Because the cited prior art fails to suggest the "continuous stirred tank reactors" of independent Claim 1, or the significant improvements associated with the process of independent Claim 1 using "continuous stirred tank reactors", the rejections under 35 U.S.C. §103(a) and on the ground of nonstatutory obviousness-type double patenting should be withdrawn.

The claims are further patentably distinguishable over Smigerski-231 because the method of Smigerski-231 is fundamentally different than the process of independent Claim 1. According to Smigerski-231, the amount of carbon black filler is divided, and the second amount of carbon black is to be added to the base particles of powdered rubber *after the end of precipitation* (see Smigerski-231 at column 6, Examples 1 to 4).

After passing through the usual viscosity increase, the precipitation was completed within approximately 10 seconds after adding the acid. With further stirring, a suspension of 157 g of water and 10 g of the aforementioned carbon black was metered in. Smigerski-231 at column 6, lines 31-36.

Thus, the second addition of carbon black takes place only after precipitation of the powdered rubber. By this method the carbon black is not anchored in the peripheral shell, but instead it creates a kind of powdering effect. At first, these products are also free-flowing. However, over the long term the outer layer of carbon black is removed by friction, etc., and so the tackiness increases.

Furthermore, in Smigerski-231 carbon black migrates from the interior of the particles to the peripheral zone due to removal of moisture. Consequently, these products are not reproducible with regards to the carbon black content, and over the long term they become tackier than the inventive products.

Because Smigerski-231 fails to suggest the independent Claim 1 limitations of "continuously and simultaneously feeding an aqueous filler mixture comprising at least one filler, and an aqueous rubber emulsion or latex into a reactor system through separate feedlines to coagulate rubber on the surface of the filler and form a precipitation suspension of filled rubber granules", the claims are further patentably distinguishable over Smigerski-231.

Claims 2 and 15 are objected to. To obviate the objection, Claims 2 and 15 are amended as suggested in the Office Action at page 3, section 2.

Claim 13 is rejected under 35 U.S.C. §112, second paragraph. To obviate the rejection, Claim 13 is amended as suggested in the Office Action at page 3, section 5.

After independent process Claim 1 is allowed, Applicants respectfully request rejoinder and allowance of withdrawn process Claim 18, which depends from independent process Claim 1.

In view of the foregoing amendments and remarks, Applicants respectfully submit that the application is in condition for allowance. Applicants respectfully request favorable consideration and prompt allowance of the application.

Should the Examiner believe that anything further is necessary in order to place the application in even better condition for allowance, the Examiner is invited to contact Applicants' undersigned attorney at the telephone number listed below.

Respectfully submitted,

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